



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,380	07/06/2005	Motohiro Arifuku	1303.45151X00	8734
20457 7590 06/30/2010 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873				
EXAMINER				
VDAYAKUMAR, KALLAMBELLA M				
ART UNIT		PAPER NUMBER		
1793				
MAIL DATE		DELIVERY MODE		
06/30/2010		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/541,380

Applicant(s)

ARIFUKU ET AL.

Examiner

KALLAMBELLA VIJAYAKUMAR

Art Unit

1793

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 19-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 19-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SI/08)
Paper No(s)/Mail Date 02/23/2010

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

- Applicant's amendment filed 06/16/2010 has been entered. Claims 1-9 and 19-25 as amended are currently pending with the application.

Response to Amendment

- The examiner enters the declaration as it was suggested by the examiner to submit the data in the form of the declaration under 37 CFR 1.132.

The declaration under 37 CFR 1.132 filed 06/16/2010 is sufficient to overcome the rejection of claims based upon Sony (JP 2001-189171). The criticality of the particle size and the hardness of the conductive particles established by the data in the specification and the declaration in combination overcomes the prior art by Sony (JP 2001-189171).

- The information disclosure statement (IDS) submitted on 02/23/2010 was filed after the mailing date of the Final Rejection on 12/16/2009. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the examiner.
- The finality of the rejection in the last office action is withdrawn over the Declaration submitted by the applicants. Applicant's arguments are moot in view of the new grounds of rejections over the documents cited in the IDS filed 02/23/2010, and the declaration is insufficient to overcome the new grounds of the rejection to follow. The bonding strength is not a limitation of the instant claims.

Claim Rejections - 35 USC § 102

Claim Rejections - 35 USC § 103

- The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(c) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

- The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1, 4-9 and 24-25 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yamaguchi et al (WO 03/022949 as evidenced by US 2004/0266913).

The recitation of *"having a property that material can electrically connect...first and second circuit members,"* in claim-1 has been given little patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478,481 (CCPA 1951).

In the instant case, the preamble merely recites the intended use of the composition, wherein the prior art can meet this future limitation by merely being capable of such intended use.

Yamaguchi et al teach an anisotropically electroconductive adhesive film (ACF) interposed between electrodes by thermo-compression bonding (0042-0048; 0051-55; 0010-0041) comprising an insulative binder of epoxy resin, glycidyl containing phenolic-novalk epoxy, phenoxy resin, an acid amide, a catalyst, and electro-conductive Au/Ni/divinylbenzene particles with a particle size of 5 micron. The ACF film had a thickness of 20 micron. The connection resistance was about 1.6-2.2 ohms and the adhesive strength ranged from 590-703 N/m (Pg-6, Table-1) and these values are either same or substantially same as that taught by the applicants (See Spec-Tables, Declaration -Tables). With regard to the properties of the conductive particle in claim-1, and the cured product in claims 1 and 6, the prior art product, composition and the components are either same or substantially same as that claimed by the

applicants and having same utility as the interconnecting material and Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Yamaguchi et al be insufficient to anticipate the instant claims, the instant claimed composition and method steps nonetheless would have been obvious to a person of ordinary skilled in the art over the disclosure because the reference teaches each of the claimed ingredients within the composition and a method of using it, and it has the same common utility as connecting material. The burden is upon the applicant to prove otherwise. In re Fitzgerald, 619 F.2d 67, 205 USPQ594 (CCPA 1980).

2. Claims 2-3 and 19-23 are rejected under 35 U.S.C. 103(a) as obvious over Yamaguchi et al (WO 03/022949 as evidenced by US 2004/0266913) in view of Sony (JP 2001-189171), Tsukagoshi et al (US 6,338,195), and Kubota (JP 2000-208178).

The disclosure on the composition of the anisotropic conductive adhesive as set forth in rejection-I is herein incorporated.

The prior art is silent about the thickness of the metal coating layers per the claims 2-3 or fails to teach the structure of electronic circuit member per the claim-19.

In the analogous art, Sony (JP-171) teaches an ACF film comprising a dispersion of conductive particles in an insulating binder of epoxy/epicoat/, acrylic resin including hydroxyls

and phenoxy resin (P-0010, 0013; 0036). The conductive particles were polymer particles of styrene, silicone, acrylic, benzoguanidine, polyolefin and rubber surface coated with a metallic layer comprising one or at least two of Ni, Au, Ag, and Cu and like with a particle size of 5 and 10 microns. The metallic layer had a thickness of 10-200 nm (P 0015-0016; 0036, 0038). The film thickness for gold was 10-30 nm. The conductive particles had hardness of 1000-8000 N/mm² (1.0-8 GPa) that can be appropriately selected (P-0020; 15). The passivation film 5 is adjacent and thicker than the electrode-4 and the bonding structure obviously meets the limitation of the structure in the claims (Abstract).

In the analogous art, Tsukagoshi et al (US 6,338,195) et al teach the connection structures using anisotropically conductive adhesive films wherein the insulating layer 18 is made of silica, silicon nitride, polyimide, etc and to be functional equivalents. The prior art also teaches a recessed electrode structure containing electrodes (16) and insulating layer (18) adjacent to it (Cl-13, Ln 18-35; Cl-20, Ln 25-45; Fig-8). The adhesive films for the connection sheet had a thickness of about 20 micron (Cl-15 Ln 37-44).

Ref claims 2-3, it would have been obvious to a person of ordinary skilled in the art to coat the polymer core of Yamaguchi with the metal layer thickness taught by Sony with predictable results and reasonable expectation of success because the teachings are in ACF containing metal encapsulated polymer core conductive particles for circuit connection applications.

Ref claim 19, It would have been obvious to a person of ordinary skilled in the art to substitute the ACF film in the electrode bonding structure of Sony with ACF of Yamaguchi as functional equivalent because Yamaguchi teaches using the film in connecting electrodes with

good adhesion and contact conductivity; and further substitute the polyimide film in the structure of Sony with a silicon oxide/nitride insulation film of Tsukagoshi as functional equivalent with predictable results and reasonable expectation of success because the teachings are in the analogous art of connecting electrodes by interposing ACF between them in obviously arriving instant claimed structure. The combined prior art teaches connecting a semiconductor element having an electrode at a position lower than a passivation film to a circuit substrate having an electrode corresponding to the electrode, including an insulating adhesive component and conductive particles. The prior art teaches interposing the connecting material film between an IC chip with an Al electrode and glass/epoxy substrate with Cu-electrode and thermally bonding at 180C and 150N forming an electrical connection through the particles (Sony P-0036; Fig-1).

Alternatively, it would have been obvious to a person of ordinary skilled in the art to substitute the ACF film in the electrode bonding structure of Tsukagoshi (Fig-8) with ACF of Yamaguchi as functional equivalent with a desire to attain improved bonding and reasonable expectation of success because Yamaguchi teaches using the film in connecting electrodes with good adhesion and contact conductivity and Tsukagoshi desires firm bonding of the components (Abstract).

With regard to Claims -20-21, it would have been obvious to a person of ordinary skilled in the art to form insulation layers in both the bonding layers with a motivation to simplify the process and minimize the cost of production over the teachings by Tsukagoshi that teaches insulating layers between the electrodes (C I-1, Ln 30-39, Fig-7 and Fig-8) so that unnecessary portions of the substrate are covered with insulating layer because it would be unnecessary to form costly protruding electrodes on the chip thus reducing the cost (CI-13, Ln 30-39).

With regard to claim 22, the instant claimed thickness of the silicon nitride/oxide insulation films in the modified structure of Sony/Tsukagoshi would have been obvious to a person of ordinary skill in the art over the teachings of Kubota that teaches a thickness of 400 nm silicon nitride film (0030, 0032) in bonding electrodes in a semiconductor device using ACF films (Abstract) that was well known in the art at the time of the disclosure of the invention by the applicants.

With regard to claim 23, Yamaguchi teaches a film size of 20 micron, and prima facie obvious (0043-44).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KALLAMBELLA VIJAYAKUMAR whose telephone number is (571)272-1324. The examiner can normally be reached on M-F 07-3.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 5712721358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KMV/
June 26, 2010.

/Stanley Silverman/
Supervisory Patent Examiner, Art Unit 1793